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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:	
TOSHIO TAKAGI, ET AL.	:	EXAMINER: ZERVIGON, R.
SERIAL NO: 10/505,169	:	
FILED: AUGUST 30, 2004	:	GROUP ART UNIT: 1792
FOR: SHOWER HEAD STRUCTURE FOR PROCESSING SEMICONDUCTOR	:	

PRE-APPEAL BRIEF REQUEST FOR REVIEW

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

REMARKS/ARGUMENTS

In the outstanding final Office Action ("OA") mailed on October 10, 2007, Claims 21-23, 25, and 27 were rejected as anticipated by (JP 06204143, "Watanabe"); Claims 1-5, 8-16, 34, and 35 were rejected as obvious over Watanabe in view of Moslehi (U.S. 5,846,883, "Moslehi"); Claims 17, 18-20, and 26 were rejected as obvious over Watanabe in view of Tanaka et al. (U.S. Pat. Pub. 2004/0020599, "Tanaka"); Claim 24 was rejected as obvious over Watanabe; and Claims 6 and 7 were rejected as obvious over Watanabe, Moslehi, and Kawada et al. (U.S. 5,536,359, "Kawada").

Regarding independent Claims 1 and 10, the shower head structure and the semiconductor processing device in accordance with the inventions recited in independent Claims 1 and 10 includes a shower head and a plurality of gas injection holes for providing the processing gas. They also include **at least one light introducing rod of a radiation thermometer inserted through at least one of the gas injection holes**. One benefit of the

inventions recited in independent Claims 1 and 10 is that by inserting the light introducing rod through the gas injection hole of the shower head, a film can be prevented from adhering to the light introducing rod by the gas injected from said one of the gas injection holes. Accordingly, the wafer temperature can be detected more accurately because the rod is kept cleaner than in conventional arrangements.

The OA asserts that Watanabe discloses a shower head including a plurality of gas injection holes and a radiation thermometer. The OA asserts that Moslehi discloses an optical plug (604) inserted through a shower head. However, in Watanabe and Moslehi, there is no suggestion that it would be preferable **to insert the light introducing rod through the gas injection hole of the shower head**. No proper combination of Watanabe and Moslehi would provide the above-noted benefit of Claims 1 and 10 inasmuch as neither of Watanabe and Moslehi is concerned with providing gas flow over the surface of a light introducing rod. The insertion of the light introducing rod of a radiation thermometer through a gas injection hole produces an effect that is more than the sum of its parts, and the mere description of an optical plug (604) in Moslehi and the simple disclosure of a showerhead with gas injection holes in Watanabe does not render the above-noted feature obvious. Thus, independent Claims 1 and 10 and the claims depending therefrom patentably distinguish over any proper combination of the cited references.

Regarding the rejection of Claims 21-23, 25, and 27 as anticipated by Watanabe, that rejection is respectfully traversed by the present response. Independent Claim 21 is directed to a semiconductor processing device including a shower head, **a heat ray introducing passage**, a radiation thermometer, and a gas introducing passage. The shower head provides the processing gas through a space formed therein. **The heat ray introducing passage is vertically formed through the shower head and separated from the space formed inside the shower head. The gas introducing passage is connected to the heat ray introducing**

passage to introduce a gas thereinto, and separated from the space formed inside the shower head. One benefit of the above-noted features is the reduction or prevention of, on an inner surface of the measurement window, an unwanted film that can disturb the temperature measurement.

The OA states that the "volume inside 6" of Watanabe corresponds to the heat ray introducing passage, the "volume between top and bottom of 14" of Watanabe corresponds to the shower head, and "16/17" of Watanabe corresponds to the gas introducing passage.

However, to one of ordinary skill in the art, a shower head for processing a semiconductor means an assembly including a space for diffusing a processing gas therein, gas inlets and a housing covering the head space. Watanabe describes that two or more gas inlets (14) facing the front face of the wafer are disposed in the gas supply head (6), and that two or more species of reactant gases are introduced into the gas supply head (6) from gas pipes (16) and (17), and then are mixed therein to thereby be supplied to a wafer (1) ([0010]). According to the specification of Watanabe, the gas supply head (6) of Watanabe corresponds to the recited shower head. For this reason, "volume inside 6" of Watanabe corresponds to the space of shower head of the present invention for diffusing a processing gas therein, and does not correspond to the heat ray introducing passage of the present invention. Accordingly, Watanabe fails to disclose **a heat ray introducing passage which is separated from the space formed inside the shower head**.

Further, assuming *arguendo* that the "volume inside 6" of Watanabe corresponds to the heat ray introducing passage, the "volume between top and bottom of 14" of Watanabe corresponds to the shower head as asserted in the OA, in accordance with the invention recited in Claim 21, the heat ray introducing passage is separated from the space formed inside the shower head. However, according to Watanabe, the "volume inside 6" is connected to the "volume between top and bottom of 14". Moreover, in accordance with the

invention recited in Claim 21, the heat ray introducing passage is vertically formed through the shower head. However, according to Watanabe, "the volume inside 6" of Watanabe is just disposed above the "volume between top and bottom of 14". Namely, a gas introducing passage of Watanabe is not separated from a space formed inside a shower head of Watanabe and is not vertically formed through the shower head of Watanabe.

Claim 22 recites that the gas is discharged from a lower end opening of the heat ray introducing passage to be diffused while the gas is falling toward outside of the susceptor; and the heat ray introducing passage is spaced apart from a center of the shower head such that a position of a main gas stream of the gas discharged therefrom falls outside an outer circumference of the substrate on the susceptor when the gas stream reaches an identical horizontal level to that of an upper surface of the susceptor.

The OA asserts that the volume inside (6) of Watanabe corresponds to the heat ray introducing passage, and the volume between top and bottom of (14) of Watanabe corresponds to the shower head. However, in Watanabe, the volume inside (6) is connected to a center portion of the volume between top and bottom of (14), and is not spaced apart from a center of the volume between top and bottom of (14), i.e., the volume inside (6) is spread over the entire surface of the showerhead, including the center of the showerhead, and Watanabe fails to disclose the heat ray introducing passage spaced apart from a center of the shower head.

Further, Watanabe and Moslehi does not teach or suggest that a position of a main gas stream of the gas discharged from the heat ray introducing passage falls outside an outer circumference of the substrate on the susceptor when the gas stream reaches an identical horizontal level to that of an upper surface of the susceptor as recited in dependent Claim 22. Therefore it is respectfully submitted that the rejection of Claim 22 should be withdrawn.

Regarding the rejection of Claims 17, 18-20, and 26 as obvious over Watanabe in view of Tanaka, that rejection is respectfully traversed by the present response.

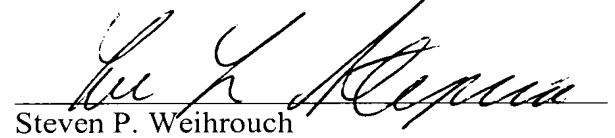
For simplification of the issues on appeal, the Amendment filed on January 10, 2008, canceled Claim 17 and every claim depending therefrom without amending any claims. As discussed in a telephone interview with Examiner Zervigon on February 11, 2008, this amendment should be entered as reducing and/or simplifying the issues for appeal, and Examiner Zervigon will send an interview summary and advisory action indicating that the cancellation of Claims 17, 19, and 20 will be entered. Accordingly, the rejection of these claims is not further addressed.

Regarding the rejection of Claim 26 as obvious over Watanabe in view of Tanaka, the OA relies on Tanaka for the feature of an isolation ring. Tanaka fails to remedy the deficiencies discussed above regarding Watanabe and independent Claim 21. Rather, Tanaka does not teach or suggest a heat ray introducing passage vertically formed through the shower head and separated from the space formed inside the shower head as recited in independent Claim 1. Accordingly, Applicants respectfully submit that dependent Claim 26 patentably distinguishes over any proper combination of Watanabe and Tanaka.

Kawada fails to remedy the deficiencies of the references discussed above.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



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